

## "Peach Cam" Brings a Little New Technology to an Old Technique

by Richard Bennett

During the planning of *James and the Giant Peach*, cinematographer Pete Kozachik demanded some new technology to streamline the animation and shooting process. He outlined a series of modifications to Skellington Productions' workhorse Mitchell GC rackover cameras. His goal was to reduce the amount of handling the cameras were subjected to as each shot progressed. This meant automating or eliminating the Mitchell rackover viewfinder mechanism, and incorporating some type of videotape which would allow the animators to view the progressing shot on video playback.

As Pete and I discussed the project, it became clear that the production couldn't afford a rotating mirror reflex conversion. The photographic team felt that a pellicle mirror reflex was inappropriate for this shooting environment.

While working at Universal Studios' Hartland Facility, I had designed a camera that used a moving beam splitter reflex system. For the Hartland camera, the pellicle beam splitter made the most sense. It's inexpensive, small, gives flicker-free viewing and can be moved into and out of the light path fairly easily. I unearthed drawings for the Hartland camera, and began working with some ideas for a conversion that would have a moving first surface mirror for the main reflex mirror. The moving mirror concept would make cost-effective use of the original Mitchell viewfinder door, ground-glass assembly and eyepiece.

What I proposed to Pete was the removal of the rack-over "L" bases from Skellington's cameras, and mounting a nose piece to the face of the actual Mitchell. The nose piece would house the following: the Nikon mount; the moving reflex mirror; a cam and track mechanism (that moves and registers the reflex mirror); mirror position sensors; the ground glass and field lens assemblies; optics to relay the image to the black-and-white video tape as well as the exist-

ing Mitchell viewfinder. The nose piece would also have the plugs and connectors needed to interface with the camera controller.

After the basic engineering was completed, an open frame prototype was built after three and a half weeks. It let me analyze how well the moving parts did their job and which of them needed to be further refined. Meanwhile, I had an optical engineer spec out the new ground glass, relay lens, prism and mirror positions. This let the reflex optics work with the original Mitchell view tube and the new CCD tap. The completed CAD program and engineering drawings were sent to several machine shops for fabrication a few days later.

The "Peach Cam," as I named it, was now a real piece of equipment. In the end, without its lens, motor, or mag, the camera specked out at twelve inches long, eight inches wide and seven inches tall.

The system uses a dovetail track, which is machined into the nose piece. The dovetail guides the reflex mirror into and out of the taking lens light path. A cam moves an over-center locking arm that locks the main reflex mirror into the proper position for view finding or imaging. A small servo motor, mounted to the face of the nose piece, drives the cam through a set of gears. Micro-switches tell the camera controller when the mirror is in the correct position. A movable prism relays 100% of the ground-glass image to the video camera. When the video tap prism is moved out of the light path, the total light bundle is relayed to the Mitchell's viewfinder and eyepiece. The Nikon mount is fastened to an adjustable lens board which was set and pinned to match Academy center. To save money we used the original Mitchell ground glass, field lens and housing, all of which were modified. Finally, a new base plate that incorporates a set of Iris Rod sockets and two sets of camera tie-down holes (one on optical center, and one on camera center) is fastened to the bottom of the camera body.

With these modifications, Cinema Engineering brought some new technology to the venerable art of stop-motion animation, and the Peach Cam brought *James and the Giant Peach* to life with a little more ease. ✻